265. Proposed by R. D. CARMICHAEL, Hartselle, Ala.

Find the Cartesian equation of a curve in a vertical plane such that a particle, sliding down the curve under the force of gravity alone, will require to pass from any point of beginning to the lowest point of the curve, a time proportional to the square of the distance to be traversed along the curve.

266. Proposed by DR. O. E. GLENN.

Given the feet of the three perpendiculars from any point a on the circumcircle to the sides of the triangle are collinear, then if on the three chords $\overline{a\,b}$, $\overline{a\,c}$, $\overline{a\,d}$, as diameters circles be described, the points of intersection of these circles are collinear. [Salmon's *Higher Plane Curves*].

267. Proposed by W. W. LANDIS, Dickinson College, Carlisle, Pa.

Prove that every orthogonal system of circles in a plane is an isothermal system.

GROUP THEORY.

9. Proposed by DR. L. E. DICKSON, The University of Chicago.

Does there exist a triply transitive group on m letters of order $m(m-1)(m-2)$ other than the linear fractional group in the Galois Field of order $p^n=m-1$ and the group 720_3 on 10 letters (Cole, *Quarterly Journal*, 1895, p. 44)? The question relates to Problem 99, MONTHLY, March, 1900.

10. Proposed by DR. O. E. GLENN.

Find the order of the group of isomorphisms of the group of order p^4 defined by the relations $P_1{}^{p^2}=P_2{}^{p^2}=I$, $P_1P_2=P_2P_1$.

MECHANICS.

183. Proposed by W. J. GREENSTREET, M. A., Stroud, England.

Two light rods are jointed at O. OA is attached by a hinge at A to a fixed rod AB and B is attached to a ring which can slide along AD. A force P acts at O towards AB at right angles to AB, and force Q acts at B along BA. The angles OAB, OBA are acute. There is no friction in the system. Show that for equilibrium we must have $P/Q=\sin AOB/(\cos AOB.\cos OBA)$.

184. Proposed by G. B. M. ZERR, A. M., Ph. D., Parsons, W. Va.

A sphere, radius a, rests between two parallel thin perfectly rough rods A and B in the same horizontal plane at a distance apart equal to $2c$; the sphere is turned about A until its center is very nearly vertically over A; it is then allowed to fall back. Prove that it will rock between A and B if $10c^2<7a^2$; also, that θ_r, the angle through which it will turn after the rth impact is given by the equation $\cos\theta_r=\frac{\sqrt{(a^2-c^2)}}{a}+\frac{a-\sqrt{(a^2-c^2)}}{a}\left(1-\frac{10c^2}{7a^2}\right)^{2r}$.